

INTRACRANIAL ANEURYSM OF THE INTERNAL CAROTID ARTERY

CURED BY OPERATION

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Case Report.—A rather frail, small, sallow man, age 43, applied at the Johns Hopkins Dispensary February 16, 1937, because of complete paralysis in the distribution of the right oculomotor (third) nerve. The family history was negative. His general health was good until last year when his stomach "went bad" from drinking. He was hospitalized from July to September, 1936, for this gastric disorder which was pronounced "ulcer." He has been a very heavy drinker for the past 18 months.

Present History.—Six days ago he was awakened by a severe pain in the right frontal region. During the afternoon there was a very severe shooting pain in the right eye, but it lasted only a moment. He slept poorly that night because of the pain. On the following morning diplopia was first noted and in the evening the right eyelid drooped. The eye was completely closed the next morning. The pain became less severe but two days later became greatly intensified and prevented his sleeping. Since then the pain has been present but less severe. Examination at that time showed a complete paralysis of the right, third cranial nerve (Fig. 1). There were no other positive findings. The eyegrounds, visual fields and reflexes were normal. A diagnosis of aneurysm along the circle of Willis was made. A roentgenologic examination of the head revealed no abnormality. The patient returned to the dispensary from time to time until March 19, 1937—nearly five weeks after the onset of his trouble—when Dr. Frank Ford referred him to me with the thought that a surgical effort might be worth while. There had been no improvement in the local condition in the interim.

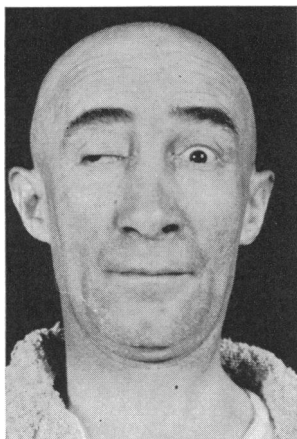


FIG. 1.—Photograph of patient taken before operation. Note the ptosis on the right, and the extreme pull of the eyeball outward due to paralysis of the 3rd nerve.

The following findings were reported by Dr. Frank Walsh, of the Ophthalmological Department, March 12, 1937:

"The upper lid is completely closed and can only be moved slightly by the frontalis muscle (Fig. 1). The globe is abducted to 45° and only moves laterally and slightly down when it rotates inward (Fig. 1). The pupil is 4½ Mm. in diameter and one-fourth larger than the left. It reacts slightly to light, directly and consensually. Visual acuity 20/40 right and 20/25 left. Visual fields normal. Fourth and sixth nerves are functioning." The Wassermann reaction was negative.

Operation.—March 23, 1937: A small hypophyseal approach was made on the right side, using the concealed incision. There was marked cortical atrophy, evidenced by the pools of fluid in the subarachnoid spaces (doubtless the result of his heavy drinking). The removal of this fluid and that from the cisterna chiasmatis gave ample room for exposure of the chiasmal region upon retraction of the frontal and temporal lobes. A pea-sized aneurysm projected from the outer wall of the internal carotid artery and adjacent to the entry of the posterior communicating artery (Fig. 4). The aneurysm, however, did not involve this vessel, but arose from the internal carotid by a narrow neck

beyond which it expanded to the size of a pea; therefore, it was quite a small aneurysm. Laterally it bridged the adjacent cerebral space and firmly attached itself to the free border of the dura which projects mesially from the middle cranial fossa; it spread out beneath the dura forming quite a broad attachment. At this site the covering of the aneurysm changed from the normal grayish-white, shiny covering, similar to that of the carotid artery, to a deep red color. Moreover, the surface was irregular, three or four tiny nodules projecting along the margin of the cavernous sinus. This change represented the false aneurysmal sac resulting from rupture of the aneurysmal sac. The third nerve passed obliquely backward in its normal course and was attached to the aneurysm at only one point—where it entered the cavernous sinus. Since it was quite evident that the red color of the aneurysmal wall indicated a reduction in its thickness, no attempt was made to dissect the attachment to the wall of the cavernous sinus. There was no evidence

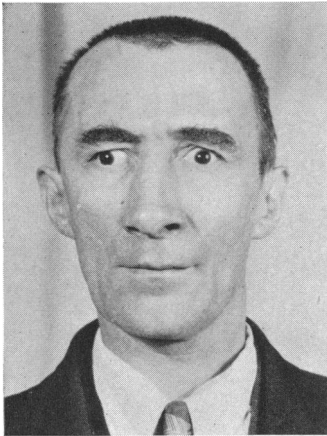


FIG. 2.—Photograph of patient taken 13 days after the operation, showing almost complete disappearance of the ptosis, and improvement in the abduction of the eyeball.

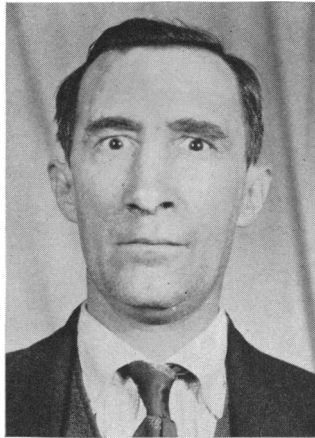


FIG. 3.—Photograph of patient taken seven months after the operation, showing complete return of all functions referable to the 3rd nerve.

of subarachnoid bleeding; doubtless the growth into the wall of the cavernous sinus prevented this. Forceps placed upon the thick aneurysmal wall pulsated forcibly.

The small neck of the aneurysm afforded an easy surgical attack. An ordinary flat silver clip was placed over the neck of the sac and tightly compressed, obliterating it completely (Fig. 4). The clip was flush with the wall of the carotid artery (Figs. 5 and 6). The sac, lateral to the silver clip, was then picked up with the forceps and thrombosed by the electrocautery. It shriveled to a thin shred of tissue. It is worthy of note that the aneurysm became much softer after the silver clip had been applied; it also ceased to pulsate.

Postoperative Course.—Aside from an attack of delirium tremens which lasted three days, patient made an uneventful recovery and left the hospital April 5, 1937—two weeks after the operation. At that time there was a definite improvement in the function of the extra-ocular muscles (Fig. 2).

On April 8, 1937 (three days later), Doctor Walsh reports: (1) Improvement in the ptosis; (2) slight upward movement; and (3) the lateral movements of the eyeball are close to normal. The pupillary reaction is still a little less than the left. Seven months later there was complete return of all functions referable to the third nerve (Fig. 3).

Perhaps ten years ago I saw, with Dr. Fuller Albright, an aneurysm situated in a somewhat similar position, localized because of the paralysis of the third nerve and pain in the eye. An attempt was made to cure it by ligation of the internal carotid artery in the neck, but the patient died of cerebral softening as a result, probably from an extending thrombus. Such an indirect

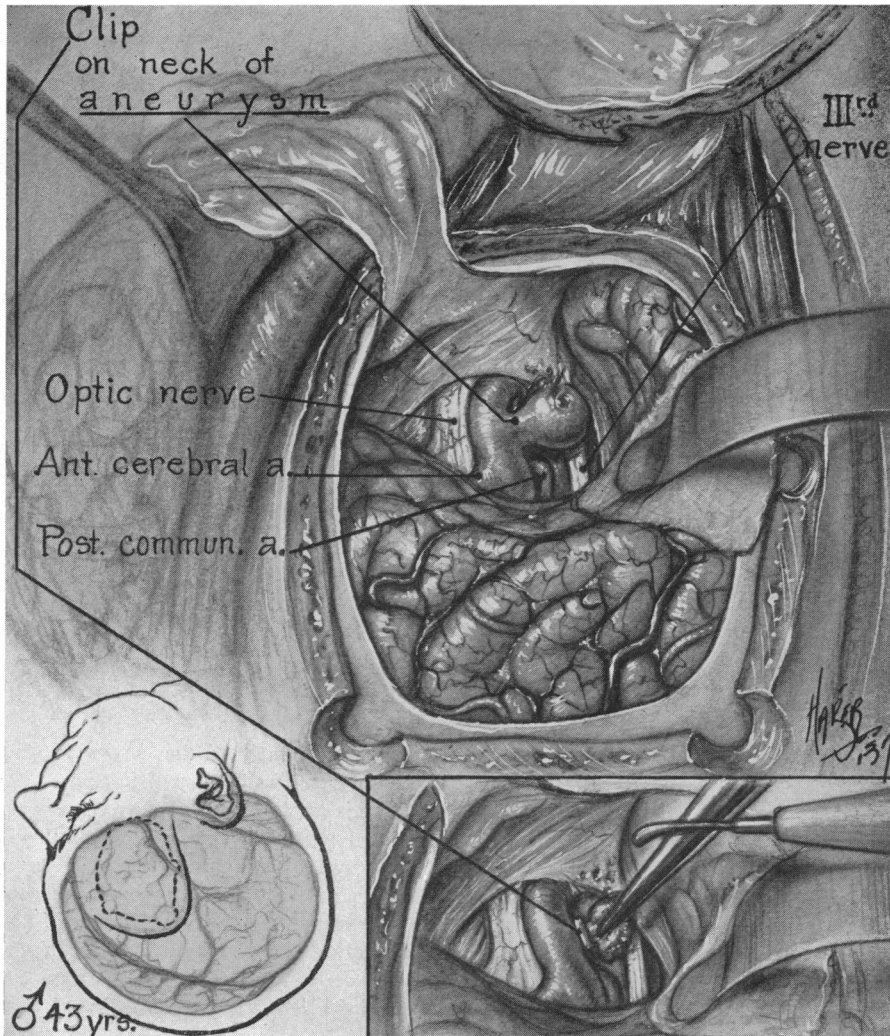


FIG. 4.—Drawing of aneurysm. Inset on the left shows the operative approach with the author's concealed incision. Inset on the right shows clip placed on the neck of the aneurysm and the cautery shrivelling the sac.

attack surely had little chance of curing the aneurysm but there then seemed no other rational effort indicated. The present case is a sequel to this unsuccessful attempt. The precise point of origin of this aneurysm could not be predetermined; it might have arisen from the carotid or the posterior com-

municating artery; the latter was our impression at the time of operation. If it had arisen from the posterior communicating artery it was hoped that a silver clip could be placed upon the artery on each side of the aneurysm if there was not a satisfactory neck by which the aneurysm could be attached directly.

A number of publications have appeared in recent years indicating that aneurysms of the circle of Willis are quite common. It is from them that most of the subarachnoid hemorrhages arise. Unfortunately, in most instances there are no localizing signs by which the position of the aneurysm or, indeed, the size of the aneurysm can be estimated. Those with paralysis of the third

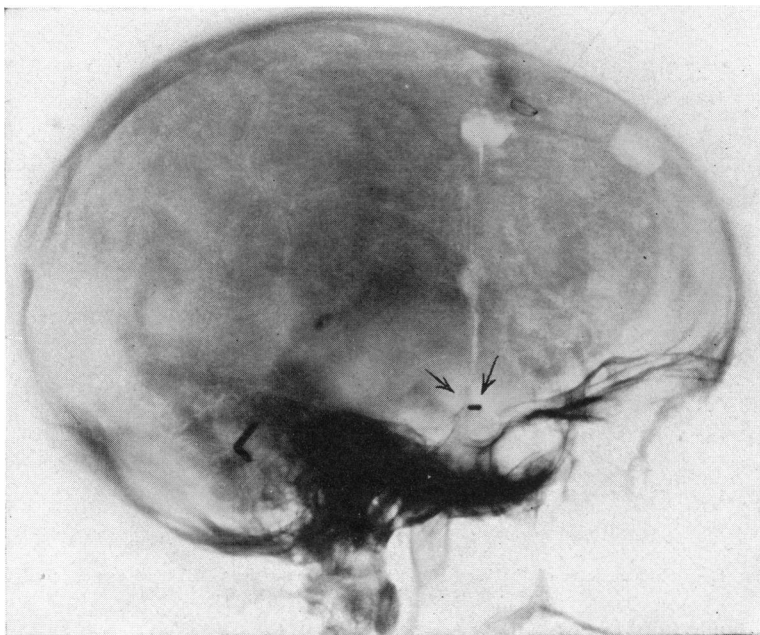


FIG. 5.—Roentgenogram showing the silver clip at the sella turcica. It also shows the size and position of the bone flap.

nerve, as in our case, are exceptional. Sands⁴ makes the statement that 47 per cent of those along the posterior communicating artery produce signs referable to the third nerve. Certainly those with palsies of the third nerve may be given the chance of surgical cure. On the other hand, there is no assurance that the aneurysm after its disclosure may be amenable to surgical attack—the aneurysm may be too large, or it may be placed too far posteriorly on the posterior communicating artery. Under the latter condition perhaps a single clip anterior to the aneurysm might be effective; or the aneurysm, if arising from the carotid, may be less favored by a narrow neck by which it can be isolated and cured by the application of a silver clip. The present effort is but a beginning or a suggestion that an aneurysm at the circle of Willis is not entirely hopeless. A word may be added concerning the cauter-

ization of the aneurysm by which it is shriveled to a small shred. The silver clip, of course, added the same sense of security against an extending thrombus, which, I should think, would be quite likely if the cautery were used alone, but perhaps no more probable than by a spontaneous thrombosis, which may conceivably occur. At least I should be fearful of such an outcome without the intervening clip to prevent its spread. Should the outlook be hopeless one would, of course, be justified in this attempt, and it is not inconceivable that even then a cure might result from thrombosis of the aneurysm without extension into the main arterial trunk.

In general, the indications for operation on aneurysms at the circle of

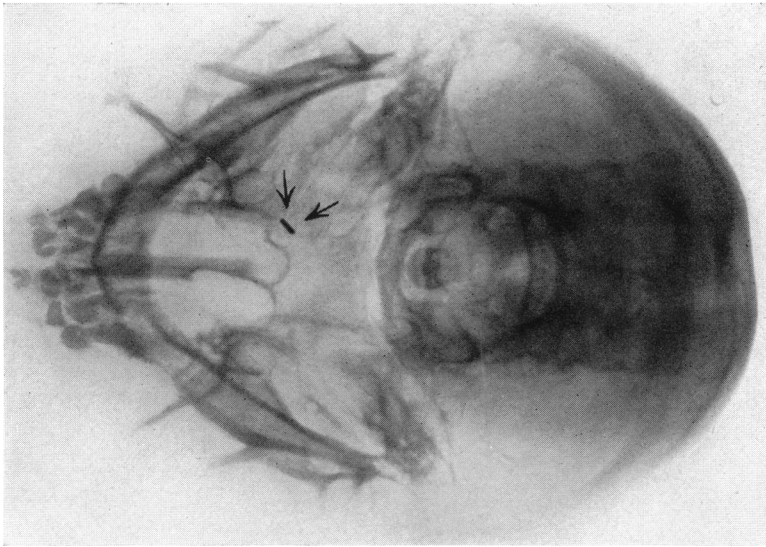


FIG. 6.—Roentgenogram of the base of the skull showing the position of the silver clip placed upon the neck of the aneurysm.

Willis and causing only subarachnoid hemorrhage, are none too clear. Certainly without a knowledge of the side of the circle of Willis upon which the aneurysm is located there would be no justification in exploring either side in search of the lesion. When a patient has had a subdural hemorrhage and has recovered, one is loath to suggest an operation, which certainly would be classed as hazardous, because another hemorrhage may never occur; at least many go for years with no further trouble, although this is not the usual story. During a subarachnoid hemorrhage and the immediate period thereafter one would not dare operate because the intracranial room needed for operation would be occupied by blood—and one needs all the room obtainable for the operation. For cases with a third nerve palsy the indications are clear enough. And where subarachnoid hemorrhages are recurring and the eventual outlook seems hopeless I should feel inclined to advise operative attack if there is even a suggestion that the aneurysm may be on one side.

Arteriography may here become an important means of locating one of these aneurysms around the circle of Willis. Then, too, the frequency of multiple aneurysms, and under such circumstances the difficulty of locating the one that is at fault, make the problem of therapy an even more difficult one.

So far as I know, this is the first attempt to cure an aneurysm at the circle of Willis by direct attack upon the aneurysm.

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